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Date: July 7, 1997

Subject: Elytroderma Disease in Ponderosa Pine West of Lake Almanor, Almanor RD, Evaluation #NE97-7

To: District Ranger, Almanor RD

At the request of Russ Volke, District Silviculturist, I examined units in the Scenic Timber Sale with Russ on June 11, 1997. Forestry technicians Robert Poindexter and Martha Bashan, and sale administrator Tom Charlton also participated.

Large aggregates of ponderosa pine in stands 64, 94 and 95 (see map) are heavily infected with elytroderma disease. The trees have 50-90 percent of their crowns infected with this needle and branch disease which is caused by the fungus Elytroderma deformans. Russ noted that the severity appears to be ten times worse than it was five years ago.

Unfortunately, very little is known about elytroderma disease and no control has been identified. The disease commonly infects ponderosa and Jeffrey pine. The disease infects individual trees as well as pine stands of all stocking levels. The disease is confined to distinct microsites with favorable environmental conditions. Outbreak years in these microsites follow years with late warm spring rains, when elytroderma spores can successfully germinate and infect newly developing pine needles. An outbreak year of elytroderma disease occurred in recent years around Lake Tahoe where half the pine died over a period of 15 years.

Elytroderma is perennial in nature since it establishes itself in twigs after infecting new needles on host trees. The impact of the disease is greatest on seedlings, saplings, and pole-sized pine with poor crowns. Pine trees are adversely affected when 40 percent or more of the twigs in the crown are blighted. A discussion of the biology of elytroderma is attached to this report.

Two ways to manage stands with elytroderma disease are to remove infected trees and/or branches or to thin the trees. Where individual trees are heavily infected, removal is an option. Where large elytroderma witches brooms are unsightly or hazardous, limb removal is an option. Where whole stands of ponderosa/Jeffrey pine are heavily infected, thinning is recommended. Thinning reduces competition stress from the infected pine so that the added stress of the elytoderma disease is less likely to kill the trees or predispose them to bark beetle attack.

The current outbreak of elytroderma west of Lake Almanor is due to the wet springs and early summers the area has been experiencing in recent years. The drought prior to these wet years probably kept this disease suppressed. The stands were planted approximately 30 years ago with 100% ponderosa/Jeffrey pine which became overstocked. This monoculture of pine in favorable microsites was

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ideal for elytroderma development. The disease infected over 50 percent of the live crowns in most of the ponderosa/Jeffery pine in stands 64, 94 and 95.

The pine in stands 64 and 95 have been thinned within the last three years and will probably survive with a reduced growth rate. The current thinning treatment being implemented in stand 94 will increase the survival of these pine as well even though some of the overstocked pine in this stand is already dead.

Soon, stands 64, 94, and 95 will all be thinned to a spacing of 16-25 feet. This should keep the elytroderma from killing the pine. However, since the disease is severe in many of the pine, the trees are weak and susceptable to bark beetle attack. It will take many years for these trees to develop healthier crowns. It is likely that many of them wont. Future thinning treatments can select for the pine with the least elytroderma infections and the healthiest crowns.

Recommendations

Monitor tree growth in these and similar stands over the next few years to see if the thinning treatments released the pine sufficiently. If not, additional thinning may be necessary.

Monitor future development of elytroderma disease in the stands. It is possible that another outbreak year will occur as a result of the recent wet weather. If the disease worsens, many of the pine may need to be salvaged before they die.

Map the microsites that are most susceptible to elytroderma disease. In the future, these high risk areas should not be regenerated with ponderosa/Jeffery pine as a major component of the stands.

Work with FPM to map and monitor future spread of the elytroderma disease to surrounding stands.

Prepare an environmental document which will allow timely thinning or salvage should the elytroderma epidemic worsen. This document should address reestablishing non-host trees in the elytroderma microsites.

Request FPM funding to partially fund and implement an environmental document to justify aggressive thinning and timely planting of non-host trees in the elytroderma microsites. If funds are not available from harvest receipts to plant non-host species, request FPM funding.

Request a FPM or Research demonstration to study the effect of tree densities on elytroderma severity.

If you have further questions or requests, please contact me at (916) 257-2151 or send me a DG message at B.WOODRUFF:R05F06A.

Bill Woodruff

BILL WOODRUFF
Plant Pathologist
NE California FPM Service Area

Attachments

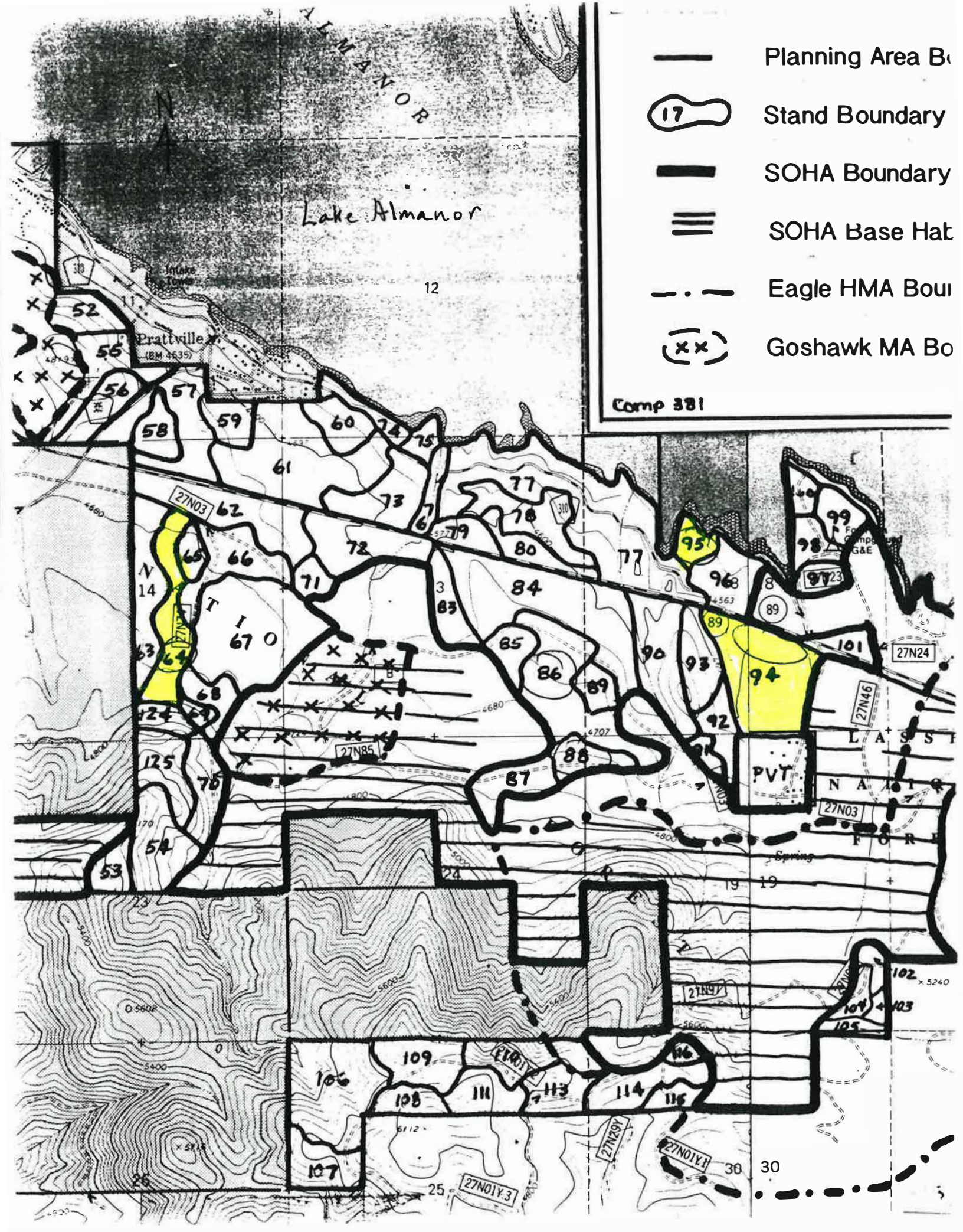
Pest Biology: Elytroderma Disease

The fungus Elytroderma deformans causes the most serious needle disease of ponderosa and Jeffrey pines in California. Occasional hosts include lodgepole, knobcone, Coulter, and pinyon pines. Unlike other needle diseases, Elytroderma infects twigs and branches systemically, allowing continued reinfection of a host's new needles even under adverse environmental conditions. Elytroderma impact is most severe in recreation forests, where the unsightly appearance of infected trees and occasional mortality can degrade the appearance and health of a stand.

Fungal fruiting bodies (hysterothecia) release spores from infected needles in late spring and early summer. Spores are windborne to susceptible hosts and, if environmental conditions are suitable, they germinate and infect the current year's needles. Initially, the fungus grows through the needle and into the twig without killing the needle. The following spring, infected needles die and turn a conspicuous red-brown. Infected branches take on a characteristic appearance, with current year's needles looking green and healthy while the one-year-old, infected needles are bright red-brown. Long, narrow, dull black fruiting bodies form on all surfaces of the dead needles and mature later in the summer, completing the infection cycle.

Fungal mycelium within the twigs spreads into the growing tips and buds, deforming future branch growth. As a result, infected branches have a broomed appearance similar to that caused by dwarf mistletoes. However, Elytroderma brooms are distinguished by several characteristics: the red-brown color of one-year-old needles in spring and early summer; fruiting bodies scattered over the needle surface; resinous, brown necrotic lesions in the inner bark of twigs and branches infected for three years or more; and, a lack of mistletoe shoots or basal cups.

Elytroderma disease kills one-year-old needles prematurely and deforms infected twigs and branches. Generally, pines are little affected if fewer than 40 percent of the twigs are infected. The disease seldom kills mature trees directly, but moderate-to-severe infection can predispose them to bark beetle attack. The disease is most severe on seedlings, saplings, and poles that are suppressed or have thin crowns. Disease outbreaks are uncommon, but once started, the disease can persist for many years, particularly in moist sites.


Planning Area B
Stand Boundary
SOHA Boundary
SOHA Base Hab
Eagle HMA Boul
Goshawk MA Bo
Camp 381
Lake Almanor
Prattville
(BM 4635)
Intake Tower
27N03
27N24
27N46
27N85
27N01Y.1
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